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Prepared By:
U S WEST Management Information Services

1. Executive Summary

This paper is presented to the CEI (Comparably Efficient Interconnection) Team for the purpose of delineating the costs which may be incurred in establishing a structurally separate entity whose sole purpose is the delivery of various enhanced services to the general public.

The focus of our efforts is to define the internal, administrative requirements rather than the actual enhanced service. While we believe the equipment and personnel in direct support of an enhanced service are dedicated to that service and, hence, do not constitute an incremental cost to structural separation, the infrastructure equipment and support personnel are shared with other, non-enhanced, services and, therefore, cannot be reallocated to the new organization.

Two options are presented concerning the housing of the new entity. The first option entails new construction while the second concerns leasing of an existing facility. Both cost estimates are predicated on the facility being located in the City and County of Denver.

The estimated costs, with the new construction option are in excess of $90,000,000; with the leasing option, $58,000,000.

Except where noted, all price quotes have been obtained from U S WEST authorized suppliers or from suppliers that U S WEST Management Information Services has used for specialized needs.

The configurations and costs detailed in Appendices I - IV are to be used for planning purposes only and should not be considered as final.

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2. Introduction

In October, 1994 California's Ninth Circuit Court of Appeals overturned the Federal Communications Commission's (FCC) ruling of Computer Inquiry III (CI-III), which essentially states that the RBOCs (Regional Bell Operating Companies) need not form structurally separate entities for the purpose of offering enhanced services and that non-structural safeguards were sufficient to prevent unfair competitive practices. In overturning CI-III, the Court re-instated Computer Inquiry II (CI-II), which requires structural separation. In November, 1994 the RBOCs filed, with the FCC, a Joint Contingency Petition for Interim Waiver of CI-II rules. This temporary waiver was granted by the FCC in January, 1995. On February 23, 1995 the FCC issued a Notice of Proposed Rule Making (NPRM) inviting reposes to any or all areas addressed. Our response will be presented on April 7, 1995.

U S WEST Management Information Services (MIS) was originally tasked with preparing a "white" paper which quantifies, from a technological cost perspective, the impact this structural separation would have on the general public. This has since been expanded to include both the facilities and support personnel needed to establish this entity.

MIS has endeavored to include as much detail as is reasonable in establishing the potential effects of this structural separation. In the Local Area (LAN) and Wide Area (WAN) Network arenas, we have used a combination of standardized equipment currently in use by MIS or configurations recommended by our resident Subject Matter Experts (SMEs). In estimating construction and lease costs, we drew upon the expertise of our own Facilities Management Group along with U S WEST Business Resources, Inc. Real Estate Division. Based upon the parameters under which this document was composed, we believe these costs are complete and accurate.

3. Assumptions

The following parameters were used in determining construction and lease costs:

- The building will be a 10 story structure with a basement. Each floor will accommodate 250 persons with 180 square feet of work station space per person. The assumed floor plan is for a rectangular shaped building 300 feet in length and 180 feet in depth. This allows for an additional 20% of floor space for support and circulation areas.

- Included is a 2,500 square foot, two story glass enclosed entry atrium.

- A 5,400 square foot mechanical penthouse is included on the roof. The penthouse is steel framed with an exterior insulated finish system.

- The building is composite steel frame with architectural precast panels for the exterior skin. At each elevation a 60 foot wide curtain wall area for architectural effect is included. Punch windows are used and are projected to be 25% of the precast skin area.

- Interior finishes for floors 1 through 10 are medium level quality with an open landscape office concept.

- The basement data center is assumed to be similar to the U S WEST Management Information Services facility, located at 181 Inverness Drive West, Englewood, Colorado.

- The site area is assumed to be 914,760 square feet (21 acres). This allows sufficient surface parking area for 2,000 vehicles at 350 square feet per vehicle with approximately 20% of the site area reserved for open space/landscape areas.

- The site is assumed to be a balanced grade condition with the provision of utilizing the additional soil material generated from the basement excavation.

- For the purposes of planning, the site is assumed to be located in the City and County of Denver.

- Construction is to begin on or about January 1, 1996.

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3. Assumptions (continued)

The following assumptions were used in determining desktop/network configurations and discounts:

- Entity has a staffing level of 2,500 employees.

- Entity consists of one (1) central site and seven (7) satellite locations.

- Dial in requirements were for 100 concurrent users at the central site utilizing three (3) T1 connections.

- Assets will not be transferred from existing U S WEST entities.

- Entity will be located in new or leased premises which do not have existing internal or state-of-the-art cable plants or data center facilities.

- Personnel will consist of a combination of new hires and employees transferred from existing U S WEST entities.

4. Hardware and Software Overview

Desktop Hardware and Software

The Office Automation configurations are based upon state-of-the-art hardware and software. All of the hardware configurations are in use at MIS and have been found to be both reliable and cost-effective. The Microsoft® and LOTUS® suite of products are generally accepted as the standard for Office Automation products and are also in use at MIS.

We believe that in equipping the staff of this entity with these products, we have provided reliability along with a reasonable price-for-performance environment.

Local Area Network Hardware and Software

The Local Area Network (LAN) configuration proposed is essentially the same as that being used at MIS. We have found it to be reliable and cost-effective in providing communications for mission critical applications. It allows for expansion when needed, lower maintenance costs, ease-of-use, security, and recoverability. It is by no means the only configuration possible and modifications can be made, where appropriate, to accommodate specialized needs.

Wide Area Network Hardware and Monitoring/Support Equipment

The Wide Area Network (WAN) configuration outlined is sufficient to handle the infrastructure communication needs for an entity of this size. We have postulated one (1) central site, which will house at least 90% of the staff, and seven (7) satellite locations. The configuration allows for direct, T1 connection to each site with expansion capabilities for an additional three (3), undefined locations. The monitoring and support equipment is adequate for a network and support staff of the size documented. The network hardware and support equipment were recommended by our resident SMEs.

Support Personnel

The management and support personnel are the minimum we believe commensurate to efficiently handle the office complex. Wide Area and Local Area Networks. The salaries were determined by local market values with 30% added for the standard U S WEST benefits package.

Spare Equipment

We believe this equipment is necessary to ensure minimal downtime should outages occur. The majority of this hardware will be stored at the central site, while the remainder will be disbursed to the satellite locations. While it is not absolutely necessary to purchase these items at start up, they should be stockpiled prior to the warranty expiration for all newly purchased hardware.

Installation Costs

Installation timeframes and costs are based up our experience and the currently hourly charge MIS uses in bidding contracts.

Private Branch Exchange (PBX)

The Private Branch Exchange (PBX) configurations are based upon staffing levels at the central site. Although there will be satellite locations, the configuration for the PBX standardizes the type of usage and cost for the approximately 250 employees using other equipment at the satellite locations. The current PBX configuration can be modified to accommodate the actual number of users or needs of the separate entity

Uninterruptable Power Supply

The central Uninterruptable Power Supply (UPS) has been scaled to support the building's data center and all communications closets within the building. The purpose of this system is, in the event of a power outage, to clean and provide power for approximately twenty minutes, for the following on-line communications equipment: (a) external network (i.e., Wide Area Network), (b) Local Area Network, and (c) PBX equipment. Cost of this unit was determined by the amount of on-line power that would be necessary to backup and support, for a limited time, a data center and all the associated critical communication hardware.

The remote UPS' have been scaled to support the communications equipment at the seven satellite sites. These units will provide the on-site backup power for the satellite network and server communications equipment. The requirement for on-line backup power is twenty minutes at the satellite sites and is a requirement that is congruent with the twenty minute backup at the central site building.

Internal Building Cable Plant

This cable plant design is based on existing communication requirements for fire safety, bandwidth, compatibility, length, and standards to connect and support 2500 users. This design provides connectivity for the following, between floors, both vertical and horizontal, the Local Area Network, and access from the main point-of-presence to all external networks, Intra-Lata, and Inter-Lata carriers.

The labor to install the cable plant design at the central site was obtained through a local cable contractor who has an established reputation at all U S WEST Market Units in the Colorado and Wyoming region. Installation costs are based on "bid" work which is standard for all new installations.

Satellite locations will have minimal cable plant installation requirements and will be installed by a local contractor using the same or similar labor "bid prices" The number of employees at each satellite location has not been established therefore, no labor installation costs have been included for the satellite locations.

Administrative Support

These are the requirements that we estimate will be needed to supply administrative support for the staff of this organization. They will handle all salary, benefit, time reporting, etc., needs. It is possible, depending on the design methodology used, that this equipment may also process customer billing information and invoice generation.

Voice/Data Circuits

The design of the voice and data circuits is a standard configuration based on the number of anticipated concurrent network data users and the 2500 voice users doing sales, marketing, financial, and internal and external support. Should growth or downsizing occur this configuration, with minor changes, could strategically support the network direction of the organization.

Building Construction/ Finishing, Automation/Security and Facilities Lease

The costs documented are based upon construction and/or leasing within the City and County of Denver. They are our best estimates given the proposed staffing levels and mission goals of this organization. Exclusions are outlined in Appendix III.

5. Conclusion

The preceding sections have defined the costs MIS estimates will be incurred if U S WEST is required to implement structural separation. While the costs themselves are substantial and will need to be recovered in some manner, a greater impact will be felt by the general public through either service disruption or the inability of U S WEST to deliver more cost effective, innovative and efficient services.

In a reorganization of this size, it is inevitable that service disruptions will occur; especially if the time frame imposed through regulation is short. Undoubtedly means will be found that will circumvent most of these outages, however, some will occur. Of greater concern is the delay or possible non-delivery of new services.

Planning, research, and development are traditionally the largest consumers of resources in the life-cycle of new ideas. In forming a new entity, personnel and funding priorities will shift from these arenas to that of merely keeping existing services operating at acceptable levels. It is conceivable that new products may be delayed for an inordinate amount of time or completely abandoned, thereby denying the public access to potentially more cost-efficient and diverse services.

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Appendices

Enhanced Services Structural Separation
Appendix I
Summary of Costs

Incremental Costs

Table 1.1 - Desktop Hardware and Software	$9 784 125 00	
Table 1.2 - Local Area Network Hardware and Software	$1 440.910 00	
Table 1.3 - Wide Area Network Hardware	$1 115.588.00	
Table 1.4 - Monitoring and Support Equipment	$566.798 00	
Table 1.6 - Spare Equipment	$293.006.00	
Table 1.7 - Installation Costs	$1.023.572.00	excluded from tax
Table 1.8 - Private Branch Exchange (PBX)	$2.022.104.00	
Table 1.9 - Uninterruptable Power Supply (UPS)	$628.924.00	
Table 1.10 - Internal Cable Plant	$382.888.00	
Table 1.11 - Administrative Support	$1.049,215.00	
Table 1.12 - Voice and Data Circuits	$10.642.00	

Equipment PreTax Cost	**$18,317,772.88**
Estimated Sales Tax - 3.5%	$657.179 60
Equipment Cost	**$18,974,961.88**

Table 2.1 - Building Construction & Finishing	$69.298,647 00	
Cost per square foot $75.25		
Table 2.2 - Building Automation and Physical Security	$301.339.00	
Table 2.3 - Facilities Lease (1st year)		$37.716 246 (

Operating Costs

Table 1.5 - Support Personnel	$2.086.500.00
Table 1.12 Voice and Data Circuits	
Flat Rate Business Circuits (annual)	$16.800.00
T1 circuit costs (annual)	$119.340 00

Summary Costs with New Construction	**$90,797,577.60**	
Summary Costs with Facilities Lease		**$58,913,837**

Enhanced Services Structural Separation
Appendix II
Equipment Cost Estimates

Appendix II contains the costs entailed with the establishment of a separate entity within the U S WEST family of companies for the purpose of offering enhanced services to the general public.

These figures represent costs that may be incurred to administratively support the organization in its mission goals.

The following assumptions were used as the basis for determining configurations and discounts:

- Entity has a staffing level of 2,500 employees.

- Entity consists of one (1) central site and seven (7) satellite locations.

- Dial in requirements were for 100 concurrent users at the central site utilizing three (3) T1 connections.

- Assets will not be transferred from existing U S WEST entities.

- Entity will be located in new or leased premises which do not have existing internal or state-of-the-art cable plants or data center facilities.

- Personnel will consist of a combination of new hires and employees transferred from existing U S WEST entities.

The ensuing general guidelines should be used when reviewing the attached tables:

- Unless otherwise noted, all price quotes have a minimum of two (2) bids.

- For planning purposes, all price quotes are the highest submitted.

- Unless otherwise noted, all price quotes include volume and U S WEST discounts.

- All equipment is purchased. Lease or rental options have not been included.

- All price quotes are valid for 30 days from date of request.

- The rationale or certifications for each configuration are detailed in Appendix IV, Reference Index.

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Enhanced Services Structural Separation
Appendix II
Equipment Cost Estimates

Table 1.1 - Desktop Hardware and Software
Contains the detailed configurations and costs for each desktop along with its associated software.

Table 1.2 - Local Area Network Hardware and Software
Contains the complete configuration required to establish a 2500 node LAN. It includes file servers, Intelligent hubs, Operating Systems, and hardware necessary to backup all data residing on this network.

Table 1.3 - Wide Area Network Hardware
Contains all hardware necessary to support a WAN consisting of one (1) central site and seven (7) satellite locations. Additionally, it contains the configuration to support 100 concurrent dial-in users at the central site.

Table 1.4 - Monitoring and Support Equipment
Contains all the hardware, software, and miscellaneous tools needed to maintain, monitor, and repair either the Local or Wide Area Networks.

Table 1.5 - Support Personnel
Details the staff required to perform End User support, Local and Wide Area Network support along with the management for each area.

Table 1.6 - Spare Equipment
This equipment is required to ensure minimal down-time during any network outage. They are essentially "hot-spares" to be used in emergency situations.

Table 1.7 - Network Installation
Contains our "best guess" estimate of the cost to install each device. It is based on hourly rates used by U S WEST MIS.

Table 1.8 - Private Branch Exchange (PBX)
Contains the total costs for both equipment and installation of the internal telephone and voice mail systems.

Table 1.9 - Uninterruptable Power Supply (UPS)
Contains costs for both the central and remote power supply configurations.

Table 1.10 - Internal Cable Plant
Contains the equipment costs for both voice and data networks within the central site.

Table 1.11 - Administrative Support
Details the hardware and software costs involved in supplying administrative support systems, i.e., Payroll, Benefits, Internal Help Desk, etc.

Enhanced Services Structural Separation
Appendix II
Equipment Cost Estimates

Table 1.12 - Voice/Data Circuits
Details the hardware and software costs involved in supplying Wide Area Connectivity with 7 satellite locations.

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Table 1.1 - Desktop Hardware and Software

Product	Quantity	Cost per Unit	Total	Comments
PowerPC Macintosh 8100	375	$3.193.00	$1.193.625.00	See Note 1
8 megabyte RAM upgrade	375	$330.00	$123.750.00	
Apple 14" Color Monitor	375	$279.00	$104.625.00	
Apple Design Keyboard II	375	$72.00	$27.000.00	
Asante 10BaseT Adapter	375	$47.00	$17.625.00	
		$3,911.00	**$1.466.625.00**	
Compaq Deskpro XE	2125	$2.236.00	$4.751.500.00	See Note 1
8 megabyte RAM upgrade	2125	$503.00	$1.068.875.00	
Compaq 14" SVGA monitor	2125	$336.00	$714.000.00	
3COM 3C509B 10BaseT Adapter	2125	$85.00	$180.625.00	
		$3,160.00	**$6,715,000.00**	
Microsoft Office 4.2 for Windows	2125	$263.00	$558.875.00	See Note 2
Word Processing (Word 6.0)		N/A		
Financial Spreadsheets (Excel 5.0)		N/A		
Presentation Software (PowerPoint 4.0)		N/A		
		$263.00	**$558,875.00**	
Microsoft Office 4.2 for Macintosh	375	$263.00	$98.625.00	
Word Processing (Word 6.0)		N/A		
Financial Spreadsheets (Excel 5.0)		N/A		
Presentation Software (PowerPoint 4.0)		N/A		
		$263.00	**$98,625.00**	
LOTUS Notes 3.3	2500	$326.00	$815.000.00	See Note 3
Electronic Mail		N/A		
Document Database		N/A		
FAX Send/Receive		N/A		
		$326.00	**$815,000.00**	
LOTUS Organizer 2.0	2500	$52.00	$130.000.00	See Note 3
Personal Scheduling		N/A		
Group Scheduling		N/A		
Conference Scheduling		N/A		
		$52.00	**$130,000.00**	

	Page Total	**$9,784,125.00**

Table 1.2 - Local Area Network Hardware and Software

Product	Quantity	Cost per Unit	Total	Comments
ODS Intelligent Hubs				See Notes 4 & 5
12 Slot Infinity Hub	10	$1 596 00	$15 960 00	
EBP Ethernet Backplane	10	$1 120 00	$11 200 00	
CBP Control Backplane	10	$1 547 00	$15 470 00	
PS1000 Power Supply	20	$2 408 00	$48 160 00	
FINC 4-040-BT RMON/SNMP Mgmt Card	10	$9 380 00	$93 800 00	
1094-BT 32 Port. RJ45 10BaseT card	110	$4 480 00	$492 800 00	
		$20,531.00	$677,390.00	
File Servers				See Note 4
Compaq Proliant 2000 5/66 Model 4200A	10	$13 714 00	$137 140.00	
32 megabyte ECC SIMM Upgrade	30	$1 929 00	$57 870.00	
128 megabyte expansion board	10	$312.00	$3 120.00	
2.2 gigabyte "hot plug" hard drive	50	$1 490 00	$74 500 00	
28.8kps modem	10	$416 00	$4 160 00	
NEC 5FGE Multisync Monitor	10	$1 015 00	$10 150.00	
EISA Bus Master 10BaseT Adapter	20	$676 00	$13 520 00	
		$19,552.00	$300,460.00	
LAN Operating System				See Note 4
Novell Netware 3.12 - 250 User License	10	$7,602.00	$76,020.00	
Intel Storage Express LAN Backup System				See Note 6
Intel Storage Express XLC Auto	3	$10 293 00	$30 879.00	
8 megabyte upgrade kit	9	$493 00	$4 437.00	
Autochanger Magazine. DDS-2 Tape Kit	3	$210 00	$630.00	
DDS-2 DAT TPE/Clnr Kit	3	$172 00	$516.00	
4-8 gigabyte peripheral DAT Box	3	$5 867 00	$17 601 00	
4mm DAT Autochanger DDS-2	3	$5 085 00	$15 255 00	
4-8 gigabyte DDS-2 Drive Upgrade	3	$2 284 00	$6 852.00	
4mm DAT. 4 gigabyte	135	$30 00	$4 050 00	
		$24 434.00	$80,220.00	
Laser LAN Printers				See Note 6
HP LaserJet 4Si. L17,P5	100	$2 899 00	$289 900 00	
		$2,899.00	$289,900.00	
Color Laser LAN Printers				See Note 6
HP Color LaserJet L2	3	$5 640 00	$16 920 00	
		$5,640.00	$16,920.00	
		Page Total	$1,440,910.00	

APPENDIX B

The Economics of Cross Subsidization

I. Industry Concerns

One of the primary arguments in favor of structural separation of enhanced services from basic service is that it eliminates the problem of assigning joint costs. Regulatory experience is replete with examples where joint production resulted in cross subsidization between two related products with the end result being large welfare losses. One need look no further than the cross subsidization between local basic service and long distance telephone service that resulted in large welfare losses and ultimately precipitated the structural dismemberment of AT&T. Even if there were substantial cost complementarities or economies of scope between local and long distance service, the distortionary impact of long distance prices well in excess of long run marginal costs subsidizing local service resulted in large welfare losses,[21] far in excess of any likely gains from joint production.[22]

The obvious question is whether we have an analogous situation here between local basic service and enhanced services. In particular, MCI, among others, poses the question of whether the potential distortionary effects of cross subsidization overshadow any cost savings from joint production. MCI, as a potential competitor in the enhanced service market, expresses their concerns

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[21] See Griffin, James M., "The Welfare Implications of Externalities and Price Elasticities for Telecommunications Pricing," *Review of Economics and Statistics*, February, 1982, 59-66 and Rohlfs, Jeffrey, "Economically Efficient Bell-System Pricing," Bell Laboratory Discussion Paper No. 138, January 1979

[22] The evidence on cost subadditivity is mixed with Heckman, James J., "A Test for Subadditivity of the Cost Function with an Application to the Bell System," *American Economic Review*, September 1984, 615-623, finding evidence of mild cost subadditivity, while other studies such as by Roller, Lars-Hendrik, "Proper Quadratic Cost Function with an Application to the Bell System," *Review of Economics & Statistics*, May 1990, 202-210, rejecting cost subadditivity. Cost subadditivity involves notions of both economies of scale and scope whereby one firm can supply the market at lower cost than two or more firms.

that cross subsidization could forestall their ability to compete in the enhanced services market.[23] While MCI has not elaborated their theory of how cross subsidization would harm them, the logic would seem to proceed as follows: Through integrated operations, the former Bell Operating Companies (BOCs) will be able to shift costs of enhanced services into the local service rate base, earning excessive returns which would then be used to subsidize the cost of providing enhanced services. With the BOCs operating at an artificial cost advantage in the enhanced service market,[24] MCI and other ESPs will be unable to compete. Under this scenario, not only would MCI and other ESPs be harmed, but economic efficiency would be severely impaired. Just as artificially high prices in excess of the long run marginal costs of local service would produce welfare losses in the local service market, artificially low prices, below costs in the enhanced service market, could also produce potentially large welfare losses in the enhanced service market. Paradoxically, the BOCs would attain a monopoly in enhanced services by setting prices below costs, thereby precluding the entry of companies such as MCI with a reputation for being an aggressive competitor.

The purpose of Appendix B is to examine the theoretical conditions under which the above cross subsidization scenario might occur and to examine the likely welfare effects of manipulation of joint costs. Section II identifies three necessary conditions for cross subsidization to occur and considers whether those conditions occur in this situation. It is shown that at least one (and possibly all three) of the necessary conditions fails to be satisfied, thereby vitiating the scenario outlined above. But having shown that the above cross subsidization scenario cannot occur, does not prove that the ability to manipulate joint costs (by loading the costs of enhanced services into the cost of local service) is benign. Section III examines the welfare effects of raising local service rates through manipulation of joint costs. Specifically, Section III asks what is the welfare loss in the basic service market, given the likely scope for joint cost manipulation.

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[23]For example, see the May 11, 1992 memo from Thomas Campbell on behalf of MCI to the Arizona Corporation Commission, Utilities Division.

[24]For example, see the May 11, 1992 memo from Thomas Campbell on behalf of MCI to the Arizona Corporation Commission, Utilities Division.

Table 1.3 - Wide Area Network Hardware

Product	Quantity	Cost per Unit	Total	Comments
CiscoSystems Router				See Notes 5 & 7
Cisco 7000 Router, 7-Slot	20	$14,925.00	$298,500.00	
4-Port Serial Interface Processor	20	$6,750.00	$135,000.00	
6-Port Ethernet Interface Processor	20	$12,000.00	$240,000.00	
High-Density V.35 DTE Male Cable	20	$75.00	$1,500.00	
		$33,750.00	**$675,000.00**	
Access-T-201 T1/FT1 Access DSU/CSU	40	$1,850.00	$74,000.00	See Notes 4 & 5
2 EIA 530 DTE Ports		N/A		
Integral T1 CSU		N/A		
AC Power Supply		N/A		
Supervisory and Craft interface ports		N/A		
Cable EIA to V.35 DCE-DTE	40	$104.00	$4,160.00	
Cable DA-15F to RJ48 Shielded	40	$52.00	$2,080.00	
		$2,006.00	**$80,240.00**	
Dial In Facilities				See Notes 5 & 8
USRobotics 16 Slot E/T SNMP Chassis	4	$4,345.00	$17,380.00	
USRobotics Dual T1 NIC/NAC Set	4	$3,080.00	$12,320.00	
USRobotics Quad V.34 Digital Modem Set	25	$2,794.00	$69,850.00	
USRobotics TC Manager/SNMP Software	1	$2,599.00	$2,599.00	
19 inch Fan Tray	4	$292.00	$1,168.00	
Cubix System 1010 Cabinet	1	$2,543.00	$2,543.00	
ERS/FT,ISA Dual PS,MUX, BC series	3	$2,846.00	$8,538.00	
ERS/FT,ISA Dual PS,MUX, QL series	4	$2,996.00	$11,984.00	
BC 4035DX2 for DECNet	20	$2,227.00	$44,540.00	
QL 4222, Dual 486DX/2-50 for Novell	40	$3,881.00	$155,240.00	
IES Supervisor	1	$1,125.00	$1,125.00	
IES Module	7	$371.00	$2,597.00	
Cubix Management Software	1	$466.00	$466.00	
QL4001 Installation Kit	1	$75.00	$75.00	
BC Series Installation Kit	1	$37.00	$37.00	
BC4045, 486DX/2-66, 2x4mb SIMMS	4	$2,246.00	$8,984.00	
250 Mb IDE drive	6	$201.00	$1,206.00	
BC 4035DX2, 486DX2/66 for CMS server	1	$2,227.00	$2,227.00	
Netware 3.12 runtime	4	$329.00	$1,316.00	
ReachOut Host Software	100	$66.00	$6,600.00	
ReachOut Viewer Software	100	$59.00	$5,900.00	
SCSI Controller, 32-bit EISA	4	$502.00	$2,008.00	
ERS/FT MUX to MUX cable	7	$37.00	$259.00	
DB9 male to DB9 female cable	100	$11.00	$1,100.00	
RJ45 male to RJ45 male cable	26	$11.00	$286.00	
		$35,366.00	**$360,348.00**	
		Page Total	**$1,115,588.00**	

Table 1.4 - Monitoring and Support Equipment

Product	Quantity	Cost per Unit	Total	Comments
SPARCstation 20 model 50	10	$9.512.00	$95.120.00	See Notes 5 & 7
17" Color Monitor		N/A		
535 megabyte hard drive		N/A		
32 megabytes RAM		N/A		
644 megabyte internal SunCD 2 Plus	10	$312.00	$3.120.00	
		$9,824.00	$98,240.00	
Distributed & Portable Network Sniffers				
Sniffer Expert Ethernet Board and Software	2	$15.500.00	$31.000.00	See Notes 5 & 7
Dolch Portable 66MHz	2	$7.350.00	$14.700.00	
10BaseT, TCP/IP, Monitor/Analysis	10	$7.495.00	$74.950.00	
Sniffmaster for X, CD-ROM	1	$4.995.00	$4.995.00	
		$35,340.00	$125,645.00	
Tools and Supplies				
JTK-5000 LAN & Computer Toolkit	5	$1.385.00	$6.925.00	See Note 8
JTK-4000 Fiber Termination Toolkit	1	$2.124.00	$2.124.00	
JTK-5 Network Toolkit	2	$919.00	$1.838.00	
Fiber Solution Kit	1	$1.595.00	$1.595.00	
Framescope 802 Protocol Analyzer	1	$4.485.00	$4.485.00	
Wirescope 100 Cat 5 Cable Verification	1	$4.350.00	$4.350.00	
Miscellaneous network tools and supplies	N/A	$5.000.00	$5.000.00	
		$19,858.00	$26,317.00	
Network Management Software				
LANVision Hub Tool for Sun Workstation	1	$3.200.00	$3.200.00	See Notes 5 & 7
CiscoWorks 2.0.2 for SUNNET Manager	1	$7.496.00	$7.496.00	See Notes 5 & 7
SUNNET Manager v2.2.1	10	$4.278.00	$42.780.00	See Notes 5 & 7
		$14,974.00	$53,476.00	
LapTop Computers				See Note 7
IBM ThinkPad 755CD model 810	5	$7.260.00	$36.300.00	
IBM 8 megabyte RAM upgrade	5	$596.00	$2.980.00	
		$7,856.00	$39,280.00	

Page Total   **$342,958.00**

Table 1.4 - Monitoring and Support Equipment (continued)

Product	Quantity	Cost per Unit	Total	Comments
Automated Network Alert System				See Note 5
Smarttrap 3278 software	1	$9 500 00	$9 500 00	
2-line Color Display	60	$3,295 00	$197 700 00	
8-port Buffered Hostess Board	2	$995 00	$1,990 00	
Message Control Software	1	$1 900 00	$1,900 00	
Messenger	1	$2,500 00	$2,500 00	
3278 attach card	2	$1 295 00	$2,590 00	
Training	5	$900 00	$4,500 00	
Compaq Deskpro XE	1	$2,236 00	$2,236.00	
8 megabyte RAM upgrade	1	$503 00	$503 00	
Compaq 14" SVGA monitor	1	$336 00	$336.00	
3COM 3C5098 10BaseT Adapter	1	$85 00	$85.00	
		$23,545.00	$223,840.00	

Page Total   **$223,840.00**

Table 1.5 - Support Personnel

Category	Staff	Annual Salary	Annual Salary Plus Benefits	Comments
Network Manager	1	$70,000.00	$91,000.00	See Note 9
Senior Project Manager	2	$60,000.00	$156,000.00	See Note 9
Network Provisioner	1	$35,000.00	$45,500.00	See Note 9
Network Engineer	2	$60,000.00	$156,000.00	See Note 10
Network Support Technician	4	$55,000.00	$286,000.00	See Note 10
Local Area Network Engineer	2	$55,000.00	$143,000.00	See Note 9
Local Area Network Administrator	1	$45,000.00	$58,500.00	See Note 9
End User Support Technician	10	$40,000.00	$520,000.00	See Note 9
Voice Support Technician	2	$45,000.00	$117,000.00	See Note 10
Help Desk Supervisor	1	$40,000.00	$52,000.00	See Note 15
Help Desk Staff	7	$30,000.00	$273,000.00	See Note 15
Building Engineer	2	$55,000.00	$143,000.00	See Note 20
Building Specialist	1	$35,000.00	$45,500.00	See Note 20
			$2,086,500.00	

Page Total $2,086,600.00

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Table 1.6 - Spare Equipment

Product	Quantity	Cost per Unit	Total	Comments
CiscoSystems Router				See Notes 5 & 7
Cisco7000 Router, 7-Slot	2	$14,925.00	$29,850.00	
4-Port Serial Interface Processor	2	$6,750.00	$13,500.00	
6-Port Ethernet Interface Processor	2	$12,000.00	$24,000.00	
High-Density V.35 DTE Male Cable	2	$75.00	$150.00	
		$33,750.00	**$67,500.00**	
ODS Intelligent Hubs				See Notes 5 & 7
12 Slot Infinity Hub	2	$1,596.00	$3,192.00	
EBP Ethernet Backplane	2	$1,120.00	$2,240.00	
CBP Control Backplane	2	$1,547.00	$3,094.00	
PS1000 Power Supply	4	$2,408.00	$9,632.00	
FINC 4-040-BT RMON/SNMP Mgmt Card	2	$9,380.00	$18,760.00	
1094-BT 32 Port, RJ45 10BaseT card	22	$4,480.00	$98,560.00	
		$20,531.00	**$135,478.00**	
PowerPC Macintosh 8100	4	$3,183.00	$12,732.00	See Notes 9 & 11
8 megabyte RAM upgrade	4	$330.00	$1,320.00	
Apple 14" Color Monitor	4	$279.00	$1,116.00	
Apple Design Keyboard II	4	$72.00	$288.00	
Asante 10BaseT Adapter	4	$47.00	$188.00	
		$3,911.00	**$15,644.00**	
Compaq Deskpro XE	21	$2,236.00	$46,956.00	See Notes 9 & 11
8 megabyte RAM upgrade	21	$503.00	$10,563.00	
Compaq 14" SVGA monitor	21	$336.00	$7,056.00	
3COM 3C509B 10BaseT Adapter	21	$85.00	$1,785.00	
		$3,160.00	**$66,360.00**	
Access-T-201 T1/FT1 Access DSU/CSU	4	$1,850.00	$7,400.00	See Notes 4 & 5
2 EIA 530 DTE Ports		N/A		
Integral T1 CSU		N/A		
AC Power Supply		N/A		
Supervisory and Craft interface ports		N/A		
Cable EIA to V.35 DCE-DTE	4	$104.00	$416.00	
Cable DA-15F to RJ48 Shielded	4	$52.00	$208.00	
		$2,006.00	**$8,024.00**	

| | | **Page Total** | **$293,006.00** | |

Table 1.7 - Installation Costs

Product	Quantity	Cost per Unit	Total	Comments
Network Installation				
Desktop Hardware & Software	2500	$100.00	$250,000.00	See Notes 9 & 12
ODS Intelligent Hubs	10	$1,120.00	$11,200.00	See notes 10 & 13
File Server Hardware & Software	10	$2,100.00	$21,000.00	See Notes 9 & 12
Routers & CSU/DSU	20	$1,120.00	$22,400.00	See Notes 10 & 13
			$304,600.00	
Telephone and Cable Installation				See Notes 5 & 14
Voice and Data cable runs	2500	$62.50	$156,250.00	
Innerduct runs	11	$125.00	$1,375.00	
200 pair feed cable runs	11	$300.00	$3,300.00	
48 strand fiber runs	11	$2,650.00	$29,150.00	
Equipment room layout and assembly	12	$100.00	$1,200.00	
Set, test, and designate telephones	2500	$13.50	$33,750.00	
Miscellaneous	1	$1,000.00	$1,000.00	
		$4,251.00	**$226,025.00**	
Octel Maxum Installation	1		**$27,450.00**	
PBX Installation	1		**$465,497.00**	

		Page Total	**$1,023,572.00**